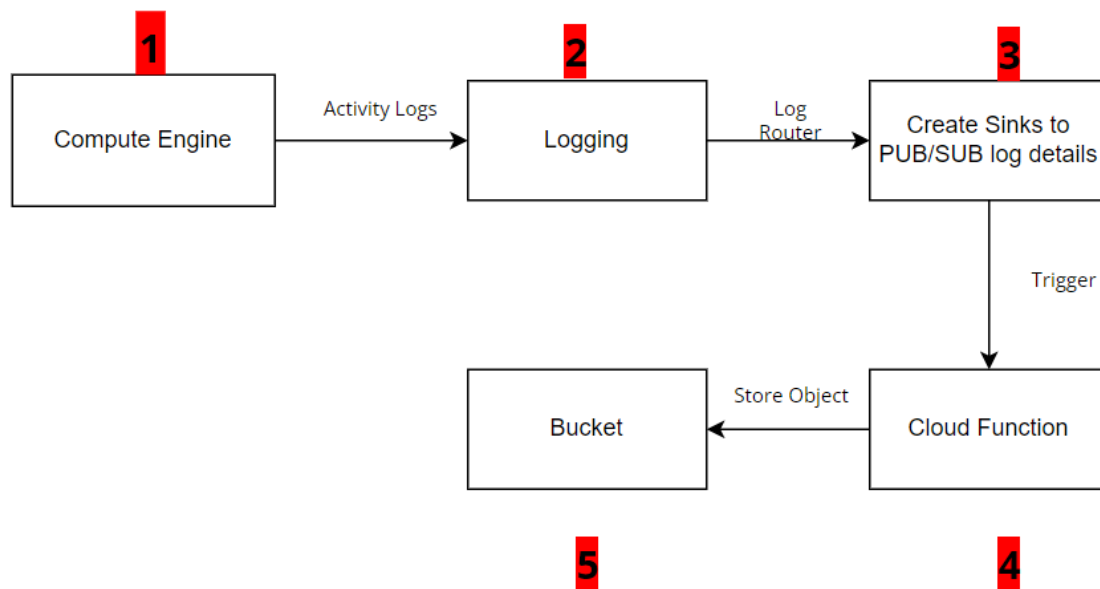


Whenever a vm is stopped the provided information should be stored in the bucket

- Configure the monitoring to get the logs for vm start/stop.
- Write a cloud function with your convenient programming language to capture data about vm start time, end time , ID and Name.
- Configure monitoring to trigger cloud functions based on monitoring.
- Cloud functions should send the data to bucket.

Below GCP services are used:

1. Google Compute Engine(GCE) – For VM instance
2. Logging – Log filters to fetch the start/stop details of VM
3. Sinks – Sinks with PUB/SUB to trigger the cloud function
4. Cloud Function – To fetch the details and store as object in Bucket
5. Bucket – Object stored in bucket



### 1. Creating GCE instance

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	✓	<a href="#">ss-gce-vm</a>	us-central1-a			10.128.0.22 ( <a href="#">nic0</a> )	34.71.245.245 ( <a href="#">nic0</a> )	SSH ▾ ⋮

### 2. Logging the VM activity logs with necessary filter to fetch the start/stop VM details

Logs Explorer [REFINE SCOPE](#) [Project](#) [SHARE LINK](#) [LEARN](#)

Query Recent (34) Saved (0) Suggested (3) Library [Clear query](#) [Save](#) [Stream logs](#) [Run query](#)

[Last 1 hour](#)  VM Instance +1 activity Severity +2 filters Show query

```

1 resource.type="gce_instance"
2 resource.labels.instance_id="5393791599035967628"
3 logName="projects/gcp-ce-project28/logs/cloudaudit.googleapis.com%2Factivity"
4 protoPayload.methodName="compute.instances.(stop|start)"
5 operation.last=true

```

☒ Log fields ☐ Histogram [Create metric](#) [Create alert](#) [Jump to now](#) More actions

Show Log fields log entries  Correlate by Download

SEVERITY TIMESTAMP  SUMMARY EDIT

Showing logs for last 1 hour from 12/28/22, 10:20 AM to 12/28/22, 11:20 AM. [Extend time by 1 hour](#) [Edit time](#)

SEVERITY	TIMESTAMP	IST	SUMMARY	EDIT
>	2022-12-28 11:15:07.218 IST	compute.googleapis.com	v1.compute.instances.stop	/zones/us-central1-a/instances/ss-gce-vm sathishk28996@gmail.com audit_log, method: "v1.compute.instances.stop", principal_email: "sathi-
>	2022-12-28 11:19:43.911 IST	compute.googleapis.com	v1.compute.instances.start	/zones/us-central1-a/instances/ss-gce-vm sathishk28996@gmail.com audit_log, method: "v1.compute.instances.start", principal_email: "sathishk2899-

- Using Log Router, route the log file to create Sink and configure the destination to PUB/SUB topic with above log filter
- Before configuring, PUB/SUB topic needs to be created

Topics [+ CREATE TOPIC](#) [DELETE](#)

[LIST](#) [METRICS](#)

[Filter](#) Filter topics

<input type="checkbox"/>	Topic ID <input type="text" value="↑"/>	Encryption key	Topic name	Retention
<input type="checkbox"/>	<a href="#">ss-gce-pubsub</a>	Google-managed	projects/gcp-ce-project28/topics/ss-gce-pubsub	—

- Trigger cloud function from PUB/SUB topic

Cloud Functions [Functions](#) [+ CREATE FUNCTION](#) [REFRESH](#) [LEARN](#) [RELEASE NOTES](#)

[Filter](#) Filter functions

<input type="checkbox"/>	Environment	Name <input type="text" value="↑"/>	Last deployed	Region	Trigger	Runtime	Memory allocated	Executed function	Authentication	Actions
<input type="checkbox"/>	1st gen	<a href="#">ss-gce-function</a>	Dec 28, 2022, 11:39:35 AM	us-central1	Topic: <a href="#">ss-gce-pubsub</a>	Python 3.8	256 MB	hello_pubsub		

- Below cloud function and bucket has been created

Cloud Functions [Function details](#) [EDIT](#) [DELETE](#) [COPY](#)

[ss-gce-function](#) [1st gen](#) Version 37, deployed at Dec 28, 2022, 8:50:44 ...

METRICS [DETAILS](#) SOURCE VARIABLES TRIGGER PERMISSIONS LOGS TESTING

**General Information**

Last deployed December 28, 2022 at 8:50:44 PM GMT+5

Region us-central1

Memory allocated 256 MB

Timeout 60 seconds

Minimum instances 0

Maximum instances 3000

Service account [gcp-ce-project28@appspot.gserviceaccount.com](#)

Build Worker Pools —

Container build log [92a74813-a2d8-428c-9b64-643419085e07](#)

**Networking Settings**

Ingress settings Allow all traffic

VPC connector —

VPC connector egress routing

EQUIVALENT REST

Cloud Storage

Buckets

Monitoring NEW

Settings

← Bucket details

REFRESH

ss-gce-bucket

Location

us (multiple regions in United States)

Storage class

Standard

Public access

Not public

Protection

None

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY NEW

Buckets > ss-gce-bucket

## Test Scenario 1: When VM is started

- VM instance started and triggered the cloud function

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

START / RESUME

STOP

OPERATIONS

INSTANCES

INSTANCE SCHEDULES

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter

Enter property name or value

?

≡

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
<input type="checkbox"/>	✓	<a href="#">ss-gce-vm</a>	us-central1-a			10.128.0.22 ( <a href="#">nic0</a> )	34.70.215.166 ( <a href="#">nic0</a> )	SSH	⋮

- Cloud function log generated

>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Instance ID:5393791599835967620
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Instance Name:projects/gcp-ce-project128/zones/us-central1-a/instances/ss-gce-vm
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	VM Start Time:2022-12-28T15:28:27.331234859Z
>	2022-12-28 20:58:30.295 IST	ss-gce-function	qlysyn4e@t0m	-----
>	2022-12-28 20:58:30.297 IST	ss-gce-function	qlysyn4e@t0m	Function execution took 2324 ms, finished with status: 'ok'

- Text file has been generated and available in the bucket
- Downloading and viewing it

ss-gce-bucket

Location

us (multiple regions in United States)

Storage class

Standard

Public access

Not public

Protection

None

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY NEW

Buckets > ss-gce-bucket

UPLOAD FILES

UPLOAD FOLDER

CREATE FOLDER

TRANSFER DATA

MANAGE HOLDS

DOWNLOAD

DELETE

Filter by name prefix only

Filter

Filter objects and folders

Show deleted data

≡

<input type="checkbox"/>	Name	Size	Type	Created ?	Storage class	Last modified	Public access	
<input type="checkbox"/>	<a href="#">VM_details.txt_20221228_152829</a>	191 B	application/octet-stream	Dec 28, 2022, 8:58:30 PM	Standard	Dec 28, 2022, 8:58:30 PM	Not public	⬇ ⋮

```
new 62 x new 63 x new 64 x new 65 x new 66 x new 67 x new 68 x new 69 x new 70 x new 71 x new 72 x VM_details.txt_20221228_151647 x VM_details.txt_20221228_152829 x
1 VM Instance ID:5393791599035967620
2 VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
3 VM Start Time:2022-12-28T15:28:27.331234859Z
4 -----
```

# Test Scenario 2: When VM is stopped

- VM has been stopped

VM instances CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP OPERATIONS

INSTANCES INSTANCE SCHEDULES

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

<input checked="" type="checkbox"/>	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input checked="" type="checkbox"/>		<a href="#">ss-gce-vm</a>	us-central1-a			10.128.0.22 ( <a href="#">nic0</a> )		SSH <span>⌵</span>

- Cloud function log has been generated

2022-12-28 21:03:21.948 IST	ss-gce-function	qlyicfao3mq	VM Instance ID:5393791599035967620
2022-12-28 21:03:21.948 IST	ss-gce-function	qlyicfao3mq	VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
2022-12-28 21:03:21.948 IST	ss-gce-function	qlyicfao3mq	VM Stop Time:2022-12-28T15:33:28.351671373Z
2022-12-28 21:03:21.948 IST	ss-gce-function	qlyicfao3mq	-----
2022-12-28 21:03:21.951 IST	ss-gce-function	qlyicfao3mq	Function execution took 364 ms, finished with status: 'ok'

- Text file has been generated and available in the bucket

ss-gce-bucket Refresh. Updated just now

Location Storage class Public access Protection

us (multiple regions in United States) Standard Not public None

OBJECTS CONFIGURATION PERMISSIONS PROTECTION LIFECYCLE OBSERVABILITY NEW

Buckets > ss-gce-bucket

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER TRANSFER DATA MANAGE HOLDS DOWNLOAD DELETE

Filter by name prefix only

Filter Filter objects and folders

Show deleted data

<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last modified	Public access
<input type="checkbox"/>	<a href="#">VM_details.txt_20221228_152829</a>	191 B	application/octet-stream	Dec 28, 2022, 8:58:30 PM	Standard	Dec 28, 2022, 8:58:30 PM	Not public <span>⬇</span> <span>⋮</span>
<input checked="" type="checkbox"/>	<a href="#">VM_details.txt_20221228_153321</a>	190 B	application/octet-stream	Dec 28, 2022, 9:03:21 PM	Standard	Dec 28, 2022, 9:03:21 PM	Not public <span>⬇</span> <span>⋮</span>

- Downloading and viewing the file

```
new 65 x new 66 x new 67 x new 68 x new 69 x new 70 x new 71 x new 72 x VM_details.txt_20221228_151647 x VM_details.txt_20221228_152829 x VM_details.txt_20221228_153321 x
1 VM Instance ID:5393791599035967620
2 VM Instance Name:projects/gcp-ce-project28/zones/us-central1-a/instances/ss-gce-vm
3 VM Stop Time:2022-12-28T15:33:20.351671373Z
4 -----
```



VM\_details.txt\_20221 228\_153321



VM\_details.txt\_20221 228\_152829

**Source code available in below repo:**

**[https://github.com/satizzzzz/SquareShift\\_Assignmet](https://github.com/satizzzzz/SquareShift_Assignmet)**